every disorder therein described, not even excepting the pains of pregnancy. Bearing this in mind, we would recommend that none save those well assured of their own sanity should read the *Journal of Mental Science*. There is so much about morbid psychology, madness, and idiocy, that weak readers are in some real danger of being taken possession of by an uncomfortable suspicion that they may be a little touched themselves. The place of honour is given to an address on idiocy by Dr. J. C. Bucknill. This is a piece of special pleading (justified, perhaps, by its occasion) for the education of idiots. Now, as these miserable abortions must be kept in life because of the *indirect* evil effects of any system of extinguishing them, we certainly desire that they should be kept in asylums and made comfortable. But we cannot even grant that they are "more worthy of our efforts than those races of animals which men strive to bring to perfection." Except in so far as Science may be advanced by such work, it seems very much of a waste of time for such a man as Séguin to labour for four months to fix the eye of an idiot as the first step in the education of sight. We cannot go into ecstacy on hearing that idiots are actually taught to use knives and forks, when so many rational beings around us have neither knives nor forks to use, nor any use for them. By all means let the charitable support asylums for idiots; but at the same time it should not be forgotten that these poor creatures can never be educated into anything useful or lovely, and that a point is soon reached beyond which further education is misspent labour.—A valuable paper on "The Use of Digitalis in Maniacal Excitement" is contributed by Dr. W. J. Mickle. Next follows, under the title of "Consciousness and Unconscious Cerebration," a rather muddled attempt, on the part of W. G. Davies, B.D., to upset Dr. Carpenter's doctrine of "unconscious cerebration." From this article one might suppose that the views combated were peculiar to Dr. Carpenter and his so-called disciples Dr. Bastian and Miss Cobbe, whereas in truth the writer has against him not these only, but also the most distinguished of living psychologists. His writing is a good deal in the bad old style, the language serving at times, as it seems to us, to obscure rather than express thought. Dr. Carpenter is accused of imagining a nervous anatomy to suit his theory. But Mr. Davies does not himself seem to be up with the latest scientific surmises. For example, in laying the groundwork of one of his own arguments, he says: "The very same cells in the visual sense-centre cannot, at one and the same moment, see brown and yellow." He does not seem to be aware that it is highly probable that the cells that see one colour never do see another. There are over a dozen other papers, all of more or less, some of them of considerable interest.

THE *Monthly Microscopical Journal* for this month commences with an article by Mr. J. W. Stephenson on the optical appearances presented by the inner and outer layers of Coscinodiscus when examined in bisulphide of carbon and in air, in which the importance of considering the refractive index of the medium in which calcareous and silicious structures are examined, is fully discussed. This is followed by a paper on some new diatoms from the harbours of Peru and Bolivia, by Mr. F. Kitton, in which *Aulacodiscus formosus* and *Omphalopelta versicolor* are the most important.—Mr. F. Wenham, in a very temperate manner, rebuffs the unjustifiable statements of the American microscopists, who, not realising the high scientific position he holds in this country, accuse him of acting unfairly to Mr. Tolles, and insinuate that he has acted from mercenary motives. He ends by saying, "I trust that Colonel Woodward, having affirmed that 'the position taken by me is certainly true for objectives, as ordinarily constructed,' will allow that this additional lens embodies a deviation from the ordinary question, which was to the effect that there would be no loss of angle aperture of ordinary objectives by the immersion of the front surface in fluids."—Dr. Braithwaite continues his observations on the bog-mosses.—Dr. Royston-Piggott considers the high-power definition of minute organic particles, in which he divides his subject into five parts, including the nature of the least circle of confusion, the nature of mixed shadows, and the nature of perfect definition.—The preparation of the brain and spinal cord for microscopic examination, forms the subject of a paper by Mr. H. S. Atkinson, in which he explains in detail the methods employed by Professor Rutherford, and the means of staining sections adopted by himself.

Petermann's Geographische Mittheilungen, No. VI.—An account of Dr. Nachtigal's travels in Northern Africa, which appears in this number, we have already noticed in the advanced sheets One of the longest and most valuable papers is by Dr. C. E. Meinicke on Dr. Bernstein's explorations in the Northern Moluccas, accompanied by a map. An important article is the second part of an account by Freiherr F. von Richthofen, of some of the results of his journey from Pekin southwestwards through China, embracing valuable details on the geology, topography, and natural history of the little known interior of that country. Another important article is on the Aurora Borealis, by M. E. Pechuel-Loesche, who for the purpose of ascertaining the real nature of the phenomenon, brings together the results of the observations of those who have carefully observed it in the Polar regions. This is to be followed by another paper in the same direction.—Dr. H. Wagner contributes an article on the Development of the German Railway System, accompanied by a well-constructed map.

A VERY interesting number of the *Bulletin Mensuel de la Société d'Acclimatation de Paris* has been published for May. One of the principal papers is a long article by the Abbé Desgodins, missionary at Yer-ka-lo, on the zoology of Thibet. The varied temperatures of its different levels are such that the country contains a great variety of animals, the fauna of both tropical and cold climates being found there. A description is given by M. Robert of his patent artificial incubators for hatching eggs, which seem to be more perfect in all their details than any of those appliances we have seen. As a proof of the usefulness of such a Society, the secretary calls attention to the increased price of certain animal and vegetable products of foreign countries, which, if the principle of acclimatisation were more fully developed, could be produced much cheaper in France. Experiments on sericulture have shown that silk of varied colour can be produced by feeding the silkworm on different leaves. Worms fed on vine leaves produce a silk of a magnificent red colour. Lettuce has been found to produce an emerald-green coloured silk. During April, 51 animals and 886 birds were received at the Gardens of the Society, while 51 animals, and 1,333 birds were distributed. Among interesting items of intelligence we may mention that the ostriches have begun to lay, and it is hoped that kangaroos may be so freely bred in France as to justify their being turned loose in suitable parts of the country. Three Trumpeter Swans were received from America.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, June 19.—"On a tendency observed in Sunspots to change alternately from the one Solar Hemisphere to the other." By Warren De La Rue, D.C.L., F.R.S., Balfour Stewart, LL.D., F.R.S., and Benjamin Loewy, F.R.A.S.

1. Hitherto in our reductions we have summed up the spotted areas of the various groups occurring on the sun's surface on any day, and have regarded their sum as a representation of the spot-activity for that day. It has occurred to us to see what result we should obtain by taking instead for each day the excess of the spotted area in the one solar hemisphere above that in the other.

2. On adopting this method, it soon became evident that during periods of great disturbance there is a tendency in spots to change alternately from the north or positive to the south or negative hemisphere, and *vice versâ*, the period of such change being about 25 days. When, on the other hand, the solar disturbance is inconsiderable, the spots do not present any such systematic oscillation.

3. We have graphically represented on a diagram the results derived from this method during three of the most considerable periods of solar disturbance.

In this diagram the observed values of hemispherical excess are marked with an asterisk, and a curve is drawn so as to equalise their smaller irregularities. The northern hemisphere is reckoned positive, and the southern negative. The unit of area is, as before, the one millionth of the sun's visible hemisphere.

4. The first of these three periods extends from the beginning of August to the end of December, 1859. We derive from our diagram the following Table, exhibiting the maximum amounts of hemispherical excess, with their respective dates:—

Date.	Hemispherical excess. North.	South.
1859, July 31	+4180	
Aug. 18		(+ 40)
Aug. 27	+2580	
Sept. 11		−2920
Sept. 17	+ 920	
Oct. 3		−1420
Oct. 16	+1000	
Nov. 3		−2480
Nov. 15	+ 120	
Nov. 20		−1320
Dec. 7	+1050	
Dec. 22		−1400

From these we derive the following values of a period of oscillation by taking the differences in dates between the positive extremes:—

27 days, 21 days, 29 days, 30 days, 22 days—mean, 25·8 days;

while doing the same with the negative extremes, we obtain:—

24 days, 22 days, 31 days, 17 days, 32 days—mean, 25·2 days.

5. The second of the three periods extends from the end of June to the beginning of November 1860. Treating this in the same manner, we obtain:—

Date.	Hemispherical excess. North.	South.
1860, July 1	+4900	
July 22		− 600
July 30	+2040	
Aug. 9		−2400
Aug. 21	+ 400	
Sept. 5		−1400
Sept. 16	+ 400	
Oct. 1		−1180
Oct. 9	+ 800	
Oct. 19		−2560
Oct. 31	(− 380)	

From these we derive, by taking the differences in dates of the positive extremes,

29 days, 22 days, 26 days, 23 days, 22 days—mean, 24·4 days;

while doing the same with negative extremes, we obtain:—

18 days, 27 days, 26 days, 18 days—mean, 22·25 days.

6. The third of these three periods extends from the beginning of May to the end of August 1862. Treating this in the same manner, we obtain:—

Date.	Hemispherical excess North.	South.
1862, May 9	+ 600	
May 22		−1160
June 3	+2960	
June 15		−2600
June 29	+1880	
July 16		−800
July 26	+2400	
Aug. 14		− 200
Aug. 23	+ 460	

Taking, as before, the distances between the positive extremes, we obtain:—

25 days, 26 days, 27 days, 28 days—mean, 26·5 days;

while from the negative extremes we obtain:—

24 days, 31 days, 29 days—mean, 28·0 days.

From the whole three periods we obtain, as the most probable mean value, 25·2 days.

7. We do not profess to have discovered the cause of these oscillations, but we would nevertheless suggest that the observational facts here brought to light may perhaps be connected with two other observational facts, the one of which was first brought to light by Carrington, and the other by ourselves.

The first of these is the fact that, generally speaking, spots in the north hemisphere have much about the same latitude as those occurring at the same or nearly the same period in the south, both sets widening or contracting together. We may perhaps, therefore, suppose, by applying this law, that the latitude of the spots which cause the positive extremes in the above series is not greatly different from that of those which cause the corresponding negative extremes.

The second observational law is that which tells us that spots about the same period have a tendency to attain their maximum at or near the same ecliptical longitude. Now, if we suppose that in the foregoing three series the greatest positive extremes were caused by the positive spots attaining their greatest size, and the greatest negative extremes by the negative spots, attaining their greatest size, it would follow that the two sets, positive and negative, must have taken their rise at places on the sun's surface 180° of longitude different from each other inasmuch as the one set about twelve or thirteen days before or after passed (let us say) the same ecliptical longitude as the other.

But if the positive set have the same latitude as the negative, and if the one is 180° of solar longitude different from the other, it would mean that *the two outbreaks are at opposite ends of the same solar diameter.*

This conclusion is an interesting one, but, of course, it requires to be verified by further observation before it be finally received. Meanwhile, we are engaged in mapping out systematically the positions of the various outbreaks of the sun's surface, and we shall soon, therefore, be able to find whether or not there be any truth in this conjecture.

Geologists' Association, July 4.—Mr. Henry Woodward, F.R.S., president, in the chair.—1. "A sketch of the Geology of Northamptonshire," by Samuel Sharp, F.S.A. A general section of the county of Northampton shows the lias as a basal formation with the inferior oolite beds of the "Northampton sands" above. Fossils are abundant, and some species are not found in other localities. The upper division consists of a nearly white siliceous sand with bands of clay and a plant bed, the whole of these deposits being evidently of estuarine and littoral origin. Above these, but unconformably, lies the bed classed as Great Oolite, and which consists of, firstly, a series of clay beds with a ferruginous base and containing a plant bed; then, secondly, a limestone series abounding with fossils and affording an ornamental stone called "Alwalton marble." The bed of clay reposing on these great oolite strata may be considered the equivalent of the "Bradford clay," and still higher in a general section will be found the Forest marble, the Cornbrash, and, highest of the secondaries, the Oxford clay. The high lands of the county are frequently capped by boulder clay and glacial gravels containing fragments from nearly the whole series of the primary and secondary rocks. A peaty fluviatile bed above the gravels contains at its base numerous remains of mammalia. The lias extends throughout the county though appearing only in the valleys, the iron sands occupy the middle and the Lincolnshire limestone the northern portion of the county, while the other formations are patchy in extension. A high table-land about Naseby gives rise to the Avon, the Welland, and the Nene, which occupy the principal valleys of the county. In past times efforts were made at considerable cost to find coal, and recently the question of whether coal can be obtained in the county has been discussed, but judging from what we know of the rocks of the nearest coal-field of Warwickshire, and of the intervening district, as much as 4,500 ft. of strata may lie above coal-seams of sufficient thickness to be worked. Moreover, Prof. Hull, F.R.S., concludes that "Carboniferous" coal will not be found at any depth in Northamptonshire.—2. "On some new Crag Fossil," by Alfred Bell. The author's observations since his former paper on the crags was read, confirm the views he then expressed as to the divisibility of the English crags into four divisions founded on palæontological evidence. He had determined 145 species (some new, some new to the crag, and some new to particular divisions) in addition to those given in his published lists.—3. "An account of the Eruption of Mount Vesuvius of April 1872," by J. M. Black. In this paper the brief but violent and destructive eruption of last year was described by the author, who has carefully noted the various phenomena that occurred during its continuance. An ascent of the volcano was made by Mr. Black, a few days after the eruption, and the form and condition of the crater observed. The author had succeeded in photographing various parts of the mountain after the eruption, and the views so taken were exhibited.

PHILADELPHIA

Academy of Natural Sciences, April 1.—Dr. Ruschenberger, president, in the chair. The following paper was presented for publication:—"On the Affinities of the Sirenians," by Theo. Gill. Prof. Leidy remarked that the rat presented this evening by Mr. L. Fussel was a specimen of the Black Rat, or *Mus rat-*

tus, which had been caught on board a ship in the vicinity of the city. This rat is exceedingly rare, but is said to have once been common enough, and is also said to have been nearly exterminated by the common brown or Norway Rat.

April 8.—Dr. LeConte announced the death, at Davidsburg, York Co., Pa., on March 10, of Freidrich Ernest Melsheimer, M.D., a correspondent of the Academy, aged nearly ninety-one years. He inherited great taste for entomology from his father, E. F. Melsheimer, a clergyman, who cultivated natural science with much success, and not only was a highly esteemed correspondent of Knoch and other European entomologists of the end of the past and beginning of the present century, but an active collaborator with Say, the founder of descriptive entomology in the United States. Entomology also owes to Dr. Melsheimer the catalogue of the described Coleoptera of the United States, which was published by the Smithsonian Institution in 1853. It was the first work of bibliographical importance in the modern history of that branch of science, and gave a powerful impetus to its development in the United States, and has greatly diminished the labour of those who have continued the study of that department:

April 15.—"Observations on a Change of Structure of a Larva of *Dryocampa imperialis*," by Thos. G. Gentry.—"Remarks on Extinct Mammals from California. Prof. Leidy directed attention to some fossils, which he had borrowed, through Prof. E. O. Hovey, from the cabinet of Wabash College, Crawfordsville, Indiana. The most interesting specimens consist of an upper molar and a complete lower molar series of a lama as large as the existing camel. Remains of a still larger species from California have been previously indicated under the name of *Auchenia californica*. The present specimens were referred to a species with the name *Auchenia hesterna*. Prof. Owen has described some remains of an equally large lama from Mexico, which he refers to an allied genus with the name *Palauchenia magna*, and which perhaps may be the same as the *Auchenia hesterna*. An inspection of Prof. Owen's figures of a series of molar teeth leads to the suspicion that he has inadvertently mistaken the upper series for the lower ones, and has thus been led to refer them to a genus different from *Auchenia*.

April 22.—"Influence of Nutrition upon Sex among the Lepidoptera," by Thos. G. Gentry.—"Fungus Parasite on a Mouse." Prof. Leidy exhibited a mouse with several whitish masses adherent to the ears, side of the face, and nose. The mouse had been caught in the children's department of Blockley Hospital. The white matter examined beneath the microscope proved to be composed of sporular bodies, single, double, or in short chains of a dozen or more. They measure about the $\frac{1}{850}$ of a line in a diameter. The fungus is a Torula or Oidium, and resembles that found in Aptha. Perhaps the disease in the mouse is the result of feeding upon articles imbued with adherent portions of apthous matter from the mouths of children.

BERLIN

German Chemical Society, June 24.—C. Rammelsberg, vice-president, in the chair.—F. Römer has investigated the following derivatives of normal propylic alcohol:—The mercaptan and its mercury-compound, propyl-xanthogenic acid and its sodium salt, and the monamine. By heating cyanate of potash with propyl-sulphate of potash no cyanurate of propyl was formed, but a well-crystallised biuret in which three atoms of hydrogen are replaced by three molecules of propyl.—R. Otto sent a well-crystallised specimen of phosphate of ammonium and magnesium from the cesspool of an old house in Brunswick, analogous to the crystals of "Struvite" found in Hamburg in 1842.—C. Scheibler showed a specimen of glass ground by a new method, which has come to us from America, and is now practised in the glassworks of M. Hasenclever at Hollberg, near Aix-la-Chapelle. By means of Giffard's injector a current of fine hard sand is thrown with great force on the glass, which is thus ground; but any pattern cut in paper and pasted on the glass remains unaltered. Even hard minerals, such as corundum, can be ground by this process.—C. Böttinger has studied the action of baryta on pyruvic acid. According to Finck two acids are thus produced, one crystalline, which he called uritinic, and one syrupy body, to which he gave the name of uritonic acid. Mr. Böttinger's researches throw doubts on the existence of the latter body, which seems to be a mixture of uritinic, acetic, and oxalic acids.—C. Rammelsberg communicated new researches on the composition of vesuvians of different origin.—W. H. Pike, of London, has treated sulfo-urea with chloride of benzoyle, obtaining well crystallised benzoyle-sulfo-urea $(C_7H_5ONH)CS(NH)_2$ of the melting-point 170°.

PARIS

Academy of Sciences, July 7.—M. de Quatrefages, president, in the chair. The following papers were read:—New clinical researches on the localisation, in the anterior lobes of the brain, of the action by which the brain contributes to the psycho-physiological faculty of speech, by M. Bouillaud. At the conclusion of this somewhat long paper, M. E. Chevreul made some remarks on Dr. Bouillaud's conclusions.—On the exponential function, by H. Hermite.—On the heat of combination referred to the solid state, a new expression for thermochemical reactions, by M. Berthelot.—The election of Dr. Carpenter, Mr. Steenstrup, and Mr. Dana, as recorded in our notes, then took place.—On a system of optical telegraphy, invented during the siege of Paris, by a commission appointed by the Governor, by M. Laussedat.—On the nutritive and milk-producing properties of *Galega officinalis*, by M. Gillet-Damitte.—On the constitution of the sun and the theory of the spots, by M. E. Vicaire. The author vigorously supported the scoriæ theory of spots, which he regards as formed by the fall of heated products of combustion into a boiling liquid; he considers that the prominences are formed at the same time and by the same agency.—Solar cyclones compared to those of our own atmosphere, by M. H. Tarry.—On a new isomer of valeric acid, by MM. Friedel and Silva.—On the transformation of succinic into malic acid, by M. E. Bourgoin. The author has succeeded in effecting this by heating fine and dry argenetic malate, mixed with fine sand, to 180°.—On the mode of decomposition of explosive bodies as compared with the phenomena of supersaturation, by MM. Champion and Pellet.—On the action of benzyl chloride on napthalamine, by MM. Ch. Froté and D. Tommasi.—Experimental researches on the action of nitrous oxide, by MM. F. Jolyet and T. Blanche. The authors believe that this gas is not a true anæsthetic, but acts by producing asphyxia.—Researches on the floral organogenesis of the hazels, by M. H. Baillon.—Discovery of the makis and the horse in the fossil state in the phosphorites of Lot, by M. E. Delfortrie.—On the crystalline forms of Scotch Lanarkite, by M. A. Schrauf.—Details of the earthquake of the 29th of June, by M. W. De Fonvielle.

BOOKS RECEIVED

ENGLISH.—Geological Evidences of the Antiquity of Man. 4th ed.: Sir Charles Lyell (J. Murray).—Human Longevity, its Facts and Fictions: Wm. J. Thoms (J. Murray).—The Human Mind; a System of Mental Philosophy: Jas. G. Murphy (W. Mullan, Belfast).—Mrs Taylor's A B C of Chemistry. Edited by W. M. Williams (Simpkin, Marshall & Co.).—Six Lectures on Light, delivered in America: John Tyndall, F.R.S. (Longman & Co.).—Journal of Anatomy and Physiology, 2nd Series, No. 12 (Macmillan & Co.).—Relations of the Air to the Clothes we wear, &c.: Dr. Max von Pettenkofer: translated by Dr. Hess (Trübner & Co.).—The Royal Readers, No. 6 (T. Nelson & Sons).—Essay on the Mathematical Principles of Physics: Rev. Jas. Challis, M.A. (Deighton, Bell & Co., Cambridge).

PAMPHLETS RECEIVED

FOREIGN.—Sitzungsberichte der Königl Böhmischen Gesel. in Prag, Jan. to June and July to Dec., 1871, Jan. to June 1872.—Eleven copies of Proceedings of Ditto: K. W. Zenger, A. von Waltenhofen, O. Feistmantel, J. Schöbl, J. Dienger, J. M. Solin, E. Weyr, W. Matzka. K. Domalip, and C. Küpper. Die Bewegungen der Thiere und ihr psychischer Horizont: von Dr. Karl Möbius.

CONTENTS

PAGE
THE PAY OF SCIENTIFIC MEN 217
THE "POLARIS" ARCTIC EXPEDITION (*With Map*) 217
SCIENCE AND ANGLING 220
MIVART'S "ELEMENTARY ANATOMY" 221
OUR BOOK SHELF 222
LETTERS TO THE EDITOR:—
  Agassiz and Forbes.—A. AGASSIZ 222
  Probosces capable of sucking the Nectar of *Anagræcum sesquipedale*.—Dr. HERMANN MULLER (*With Illustration*) 223
  An Order of Merit.—A. H. BROWNE 223
  Geological Subsidence and Upheaval.—J. F. ANDERSON 223
  Curious Rainbow.—G. J. ROMANES 224
CHLOROPHYLL COLOURING-MATTERS, II. By H. C. SORBY, F.R.S. . . 224
THE NEW LABORATORIES OF THE NATURAL HISTORY MUSEUM, PARIS (*With Illustration*). 226
AERIAL SPECTRES (*With Illustrations*) 227
THE GEOLOGICAL SURVEY OF INDIANA 228
INTELLECT OF PORPOISES. By W. SAVILLE KENT 229
AN INTERNATIONAL COINAGE 229
NOTES 230
ON THE GERM THEORY OF PUTREFACTION AND OTHER FERMENTATIVE CHANGES. By Prof. LISTER, F.R.S. 232
SCIENTIFIC SERIALS 233
SOCIETIES AND ACADEMIES 234
BOOKS AND PAMPHLETS RECEIVED 236